

to the nw., with centre bearing nw. by w.; lightning disappeared from se., and squall passed rapidly to sw., at the same time raising a column of water about seventy feet high; could clearly observe water rushing down centre of spout and plough-

ing up the surface of the sea quite forty-five or fifty feet above level of the ocean. This was the largest water-spout I or other members of the crew ever saw. Wind kept steady in direction, but increased to force 7; barometer not affected."

COTTON REGION REPORTS.

In the following table are given the means of the maximum and minimum temperatures, and the average rainfall for the cotton-belt districts during the month. For the purpose of comparison the means for October of the five preceding years are also given.

Except in the districts of Memphis, Little Rock, and Galveston, the rainfall was largely in excess of the average; it was more than double the average in the districts of New Orleans, Savannah, Montgomery, and Mobile; for the Wilmington district it was more than four times the average, and for the Augusta district nearly three times the average. Marked deficiencies occurred in the districts of Little Rock and Memphis.

The means of the maximum and minimum temperatures were generally decidedly below the average for all districts, the departures exceeding 4° in the districts of Wilmington, Atlanta, Montgomery, Mobile, and New Orleans.

Temperature and rainfall data for the cotton districts, October.

Districts.	Rainfall.			Temperature.								Extremes for Oct., 1887.	
	Average for Oct. of five preceding years.	Average for Oct., 1887.	Departures.	Maximum.			Minimum.						
				Mean for Oct. of five pre- ceding years.	Mean for Oct., 1887.	Departures.	Mean for Oct. of five pre- ceding years.	Mean for Oct., 1887.	Departures.				
New Orleans...	Inch.	Inch.	Inch.	°	°	°	°	°	°	°	°	°	°
Savannah	2.16	5.16	+ 3.00	80.0	75.9	- 4.1	58.4	53.9	- 4.5	97	28		
Charleston	2.09	4.23	+ 2.14	80.3	76.8	- 3.5	58.9	55.7	- 3.2	97	32		
Atlanta	2.23	3.80	+ 1.57	77.1	74.5	- 2.6	54.3	53.7	- 0.6	88	35		
Wilmington	2.15	3.32	+ 1.17	75.3	70.5	- 4.8	53.3	49.3	- 4.0	90	26		
Wilmington* ..	1.68	8.19	+ 6.51	76.3	70.1	- 6.2	53.4	50.1	- 3.3	93	27		
Memphis	2.25	2.02	- 0.23	75.3	71.7	- 3.6	51.5	47.6	- 3.9	89	24		
Galveston*	2.83	2.99	+ 0.16	80.6	77.9	- 2.7	58.6	55.0	- 3.6	95	28		
Vicksburg	2.57	3.90	+ 1.33	78.2	74.5	- 3.7	55.6	54.1	- 1.5	91	31		
Montgomery	1.31	3.40	+ 2.09	79.1	73.6	- 5.5	59.1	53.3	- 5.8	88	31		
Augusta	1.94	5.48	+ 3.54	76.8	72.4	- 4.4	53.8	50.7	- 3.1	96	30		
Little Rock	1.85	1.05	- 0.80	76.0	75.3	- 0.7	50.7	48.5	- 2.2	91	25		
Mobile	1.76	3.34	+ 1.58	79.6	74.4	- 5.2	55.3	48.8	- 6.5	93	27		

*Average for four years only.

INLAND NAVIGATION.

In the following table are shown the danger-points at the various river stations and the highest and lowest depths for October, 1887, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, October, 1887 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La....	29.9	28, 29, 30	11.8	4, 2	1.4	7.6
<i>Arkansas River:</i>						
Fort Smith, Ark....	22.0	13	9.4	4, 5, 6	0.7	8.7
Little Rock, Ark....	23.0	16	8.5	9, 10, 11	1.6	6.9
<i>Missouri River:</i>						
Omaha, Nebr.....	18.0	1	7.2	20, 25-31	5.7	1.5
Leavenworth, Kans.	20.0	1	8.3	24	6.6	1.7
<i>Mississippi River:</i>						
Saint Paul, Minn....	14.5	9, 13, 17, 24	2.0	2, 3, 26-28	1.7	0.3
La Crosse, Wis....	24.0	21-26	3.4	29-31	2.9	0.5
Dubuque, Iowa....	16.0	25, 26	3.7	2, 4, 9-13	3.3	0.4
Davenport, Iowa....	15.0	1-9	2.5	11-20, 22, 23, 27-31	2.3	0.2
Keokuk, Iowa.....	14.0	1	2.6	21, 22, 25-27, 29-31	1.9	0.7
Saint Louis, Mo....	32.0	1	8.5	27, 30, 31	5.7	2.8
Oairo, Ill.....	40.0	1, 2	5.2	27	2.4	2.8
Memphis, Tenn....	34.0	1	5.4	29-31	2.8	2.6
Vicksburg, Miss....	41.0	1	2.8	31	- 1.8	4.6
New Orleans, La....	13.0	16	4.2	31	1.9	2.3
<i>Ohio River:</i>						
Pittsburg, Pa.....	22.0	10, 26	6.1	24, 25	5.7	0.4
Cincinnati, Ohio....	50.0	7	4.9	18-20, 25, 26	2.8	2.1
Louisville, Ky....	25.0	1, 9	2.6	14	1.9	0.7
<i>Cumberland River:</i>						
Nashville, Tenn....	40.0	4	1.9	19-23	- 0.2	2.1
<i>Tennessee River:</i>						
Chattanooga, Tenn.	33.0	28	4.7	15-17	1.2	3.5
<i>Monongahela River:</i>						
Pittsburg, Pa.....	29.0	10, 26	6.1	24-25	5.7	0.4
<i>Savannah River:</i>						
Augusta, Ga.....	32.0	28	12.0	16	5.7	6.3
<i>Sacramento River:</i>						
Red Bluff, Cal.....	.....	11-18	0.6	1-10, 19-31	0.5	0.1
Sacramento, Cal....	.....	1-31	7.2	1-31	7.2	0.0
<i>Willamette River:</i>						
Portland, Oregon....	.....	1	3.5	25	0.0	3.5

STAGE OF WATER IN RIVERS AND HARBORS.

Toledo, Ohio: navigation on the Maumee River was suspended on account of low water on the 3d. The high wind

which prevailed during the night of the 2-3d drove the water out of the river into the lake, leaving several vessels aground. At Perrysburg, about ten miles southwest of Toledo, the Maumee River was lower than has been known for many years, a large part of the river bed being completely bare.

Cairo, Ill.: owing to the low stage of water in the Ohio River on the 12th the steamer "Gus Fowler" ran aground near Mound City. On the 27th the river reached the lowest stage since January, 1887. The Illinois Central Railroad company was compelled to extend its cradles farther into the river to enable the transfer steamers to reach them. The low water in both the Mississippi and Ohio rivers has caused a practical suspension of navigation, resulting in great inconvenience and heavy losses.

ICE IN RIVERS AND HARBORS.

Moorhead, Minn.: the Red River of the North froze the 24th. Fort Buford, Dak.: the Missouri River froze over during the night of the 24-25th, ice forming to a thickness of two inches. On the 26th the ice broke up and passed down. The river was very low during the greater part of the month.

Cedar Rapids, Linn Co., Iowa: for the first time in October for many years Cedar River froze over, on the 25th.

HIGH TIDES.

Jacksonville, Fla.: the tide was unusually high at the mouth of the Saint John's River on the 15th.

Atlantic City, N. J.: during the morning of the 18th the tide was very high and caused some damage to the board walks; the beach was washed away in some places.

Wellfleet, Mass.: the highest tide ever known in this vicinity occurred on the 21st; the lower streets of this place were flooded.

The voluntary observer at Taunton, Mass., states that during the week ending October 23d the tides were unusually high.

The Signal Service observer at Kitty Hawk, N. C., reports high tides on the 30th and 31st.